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Ames Research Center



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Unified Life Detection System—A Concept

A system for the detection of extraterrestrial life must receive soil from a collector head, meter the soil to ampules and inject nutrients, seal the ampules, and eventually sample and analyze generated gases with a mass spectrometer; all data are transmitted to earth.

A systematic investigation of techniques and hardware which could possibly be utilized in a life detection system to perform the functions indicated above has resulted in the identification of a group of candidate concepts and the selection of a "unified system" which incorporates the desirable features of the concepts.

The principle theme of the unified system concept is to permit the greatest flexibility in the procedural details for the experiments which can be performed in individual ampules. Results of the studies performed thus far suggest that soil which is received in a centrally-located funnel can be effectively metered by a shuttle mechanism which transfers soil from the funnel to one of a series of ampules mounted on a horizontal wheel; the wheel is indexed by a Geneva movement to bring another ampule into position for receiving a soil sample. After each ampule is filled, it is moved rapidly out of the wheel; nutrients that are

contained in quartz capsules are released into the ampules by electrically-activated spring cartridges. Then, after the ampules are connected to their caps, hermetic closure is effected by a spring-washer device released electrically. Individual molecular leak valves on each ampule cap connect to a manifold leading to a quadrupole mass spectrometer that is used to analyze the gases generated in the ampules.

Note:

Requests for further information may be directed to:

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NASA has decided not to apply for a patent.

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